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NAPIER TERCENTENARY CELEBRATION, 1914.

To celebrate the tercentenary of the publication in 1614 of John Napier's *Logarithmorum Canonis Mirifici Descriptio* it is proposed to hold a Congress in Edinburgh, on Friday, 24th July, 1914, and following days. The celebration is being held under the auspices of the Royal Society of Edinburgh, on whose invitation a General Committee has been formed, and will be opened with an Inaugural Address by Lord of Appeal Sir J. Fletcher Moulton, F.R.S., LL.D. (Edin.), &c., followed by a Reception given by the Right Honourable the Lord Provost, Magistrates, and Council of the City of Edinburgh. On the Saturday and Monday the historical and present practice of computation and other developments closely connected with Napier's discoveries and inventions will be discussed.

A Memorial Service will be held in St. Giles' Cathedral on the Sunday.

Merchiston Castle, the residence of Napier, has long been occupied by the well-known public school, which draws pupils from all parts of the British Empire. The Governors of the School have kindly invited the members of the Congress to visit the Castle and Grounds on the Saturday afternoon.

Relics of Napier, collected by Lord Napier and Ettrick and other representatives of the family, will also be on view; and it is intended to bring together for exhibition books of tables and forms of calculating machines, which may reasonably be regarded as natural developments of the great advance made by Napier.

Individuals, Societies, Universities, Public Libraries, &c., may become Founder Members on payment of a minimum subscription of £2; and each Founder Member will receive a copy of the Memorial Volume, which will contain addresses and papers read before the Congress, and other material of historic and scientific value. It is important to secure as many Founder Members as possible, so that a volume may be brought out worthy of the memory of Napier.

Ordinary subscribers attending the Celebration may receive copies of the Memorial Volume at a reduced price. Those wishing to attend the Celebration are requested to communicate with Dr. C. G. Knott, General Secretary, Royal Society of Edinburgh.

ROYAL METEOROLOGICAL SOCIETY.

THE monthly meeting of this Society was held on Wednesday evening, April 22nd, at the Institution of Civil Engineers, Great George Street, Westminster, Dr. H. N. Dickson, Vice-President, in the chair

Mr. J. E. Clark and Mr. R. H. Hooker presented their joint report on the phenological observations from December, 1912, to November 1913. This dealt with the dates of the flowering of plants, the song and migration of birds, the appearance of insects, and also the character of farm crops. Considering England as a whole, the main feature of the weather, so far as it affected crops, was the cold wet summer of 1912, the abundant precipitation during the spring, which resulted in a bountiful hay crop, and the subsequent dry summer. October and November, 1912, were both fairly dry, so that the autumn was, on the whole, favourable for wheat sowing; but this operation was very behindhand, owing to the 1912 harvest having been very late, so that large areas of wheat remained to be sown at the end of November, when the rain set in. The later periods of the cereal year were probably not unsuitable to the wheat, and in the result the crop was just under average. Barley, also, in England, was not much below average. Oats, which require plenty of rain in the early summer, were very deficient in England, but satisfactory in the moister Scotland and Ireland. Potatoes were a heavy crop everywhere. Roots were deficient in England, especially in the drier Midlands; in Scotland and Ireland they were excellent. Hops were poor and a feature of the season was the unusual difficulty of estimating the yield until the hops were picked. The hay crop was abundant, and an interesting feature is that in the South and Midlands the hay from clovers and rotation grasses was relatively much better than that from permanent meadow land. Harvesting began in England at about the average time—a shade earlier in the case of wheat; a little later in the case of oats. In Wales it was a little later. There was a tendency for the dates to be rather earlier on the eastern side of the country than in the west. The duration of the harvest was also about an average, and rather longer than usual in Wales. In this case also it was distinctly shorter on the east than on the west. The explanation is that in the moister and somewhat later western west and north the broken weather set in in September before operations were completed, whereas in the south the corn had mostly been got in before the conditions became unfavourable. The quality of the crops was good in the case of wheat and barley, but that of oats was less satisfactory. In the south-west of England three special features were the destructive prevalence of green fly on fruit trees, the immense number and late survival of wasps, and the scarcity of most butterflies. Several observers, however, note the reappearance of clouded yellows. The further destructive spread of the "Isle of Wight disease" among

bees, which has practically cleared them from many parts of England, S.E. especially, to the serious detriment of fruit prospects, was also recorded.

Col. H. E. Rawson said he had often noticed the wonderfully accelerated growth of certain plants immediately after a thunderstorm. He had also been carrying out experiments to see the effect of sunshine at certain hours of the day on different plants. Tomatoes, for example, made rapid growth when receiving sunshine in the early morning, and suffered no ill effects if there was no sunshine in the latter part of the day.

Mr. E. G. C. Barton said that the electrification of the air has a great effect in accelerating the growth of plants, and he thought it might perhaps account for some of the accelerated growths mentioned in the paper. He believed that a bad plant season was almost invariably followed by a good season.

Mr. J. Hopkinson said that in Hertfordshire, in which county he was specially interested, a wet season was favourable to all crops. The year in question was generally wet over Hertfordshire and the yield of crops was 2 per cent. better than the average for ten years, while over England as a whole the yield was 1 per cent. less than the average.

Mr. F. Campbell Bayard and Mr. L. C. W. Bonacina also spoke, and Dr. H. N. Dickson warmly thanked the authors for their continued work on behalf of the Society.

Mr. Hooker, in replying, said that he had found that a wet summer was usually followed by a poor crop in the following year, and *vice versa*, except in the case of potatoes. He essayed a forecast that, owing to a comparatively dry season in 1913, all crops ought to be good in the present year, except perhaps clover which prefers either cool or damp conditions.

A paper by Mr. A. T. Bamford, Superintendent of the Colombo Observatory, Ceylon, "On a small Anemometer for Tropical Use," was read by Mr. Marriott. In the discussion that followed Col. H. E. Rawson asked if particular attention was paid to the kind of oil used in the Robinson anemometer. He was of opinion that in any instruments with rotating cups the kind of oil used should be most carefully analysed.

Dr. C. Chree doubted if this instrument was any improvement on many anemometers already in use. In twenty years' experience he had found the cup anemometer to show a remarkably constant ratio. He thought that the kind of oil used might have some slight effect on the records in light winds up to say four miles per hour, but in winds of greater velocity the effect would be negligible.

Mr. W. B. Tripp also spoke.

The following gentlemen were elected Fellows of the Society:—Major C. J. Burke, Major E. M. Maitland, Mr. W. R. Plowes, Mrs. W. N. Shaw, Mr. W. F. S. Wilkinson.

METEOROLOGICAL NEWS AND NOTES.

MR. CARLE SALTER gave a popular Lecture on "Rain" at the Technical College, Colchester, on April 23rd.

AN AEROLOGICAL OBSERVATORY has been established at Agra, India, for upper air research under the direction of Mr. J. H. Field, Imperial Meteorologist.

"BRITISH RAINFALL, 1913," is now in an advanced stage of preparation, and it would greatly facilitate the work if any Observers who have not yet sent returns of rainfall for last year would do so shortly.

DR. JULIUS HANN'S well-known *Lehrbuch Der Meteorologie* is being re-issued in parts, of which three have already appeared. No pains have been spared to render this new edition thoroughly up-to-date, a special feature being the copious foot-notes to works of reference.

AN INSTITUTE OF OCEANOGRAPHY is to be established at Havre, at a cost of about £33,000. Plans for a handsome building about 275 feet long and 40 wide have been drawn up by a prominent Paris architect. It is hoped to have the building completed in time for the meetings of the Scientific Congress to be held at Havre in the autumn.

THE METEOROLOGICAL OFFICE, since May 1st, has adopted the new system of barometric readings which are now given in the Daily Weather Map in millibars. Isobars are drawn for intervals of 5 millibars (0·15 in.) as against the 0·10 in. formerly employed. Measurements of rainfall at the telegraphic reporting stations of the Meteorological Office are now printed in millimetres, and references to the velocity of the wind in the remarks column are quoted in metres per second, instead of miles per hour as formerly. The temperature values continue to be given in degrees Fahrenheit.

THE METEOROLOGICAL CONFERENCE which will meet in Edinburgh on Tuesday, September 8th, 1914, and the four following days, to which reference was made in our March number, promises to be one of great interest and importance. Special attention will be given to the teaching of meteorology in schools, and to the relation of meteorology to aviation. There will be an exhibition of historical and modern instruments. The subscription for members of the Conference has been fixed at 10s., whilst ladies accompanying members will be admitted on payment of 5s. Tickets, price 5s., will be issued to matriculated students of any University. Those desirous of attending the Conference or who may wish further information are requested to communicate with the Hon. Secretary of the Committee, Mr. F. J. W. Whipple, M.A., at the Meteorological Office, South Kensington, London, S.W.

THAMES VALLEY RAINFALL. —— APRIL, 1914.

Less than one inch
1in.
1·0in.
1·5in.
2in.
Less than 1·5in.
ALTITUDE SCALE
Below 250 feet
250 to 500 feet
500 to 1000 feet
Above 1000 feet
SCALE OF MILES
0 5 10 15 20
WARWICK
NORTHAMPTON
BEDFORD
CAMBRIDGE
SUFFOLK
WORCESTER
GLOUCESTER
OXFORD
BUCKINGHAM
HERTFORD
ESSEX
MIDDLESEX
LONDON
BERKSHIRE
WILTSHIRE
HAMPSHIRE
SURREY
KENT
SUSSEX
CHILTERN HILLS
COTSWOLD HILLS
WHITE HORSE HILLS
SALISBURY PLAIN
FOREST RIDGES
RIVER THAMES
Stratford on Avon
Banbury
Towcester
Bedford
Biggleswade
Shelford
Newmarket
Bury St Edmunds
Haverhill
Sudbury
Newport
Halstead
Colchester
Great Dunmow
Maldon
Chelmsford
Ongar
Southminster
Wickford
Southend
Brentwood
Romford
Epping
Loughton
Bishops Stortford
Throcking
Royston
Ampthill
Woburn
Buckingham
Winslow
Hitchin
Bennington
Stevenage
Hertford
Watford
Potters Bar
Barnet
Hendon
Harrow
Hampstead
Camden Square
Mill Hill
Ealing
Greenwich
Woolwich
Dartford
Sheerness
Chatham
Maidstone
Ashford
Tenterden
Tunbridge Wells
E. Grinstead
Sevenoaks
Knockholt
Croydon
Epsom
Reigate
Dorking
Guildford
Woking
Staines
Teddington
Slough
Windsor
Hedsor
High Wycombe
Cheshunt
Hertford
St Albans
Berkhampstead
Aylesbury
Oxford
Abingdon
Wantage
Wallingford
Reading
Newbury
Hungerford
Marlborough
Swindon
Malmesbury
Cirencester
Tetbury
Stroud
Gloucester
Cheltenham
Evesham
Worcester
Tewkesbury
Blockley
Stow on the Wold
Moreton in Marsh
Chipping Norton
Woodstock
Witney
Bicester
Thame
Farringdon
Wantage
Lambourn
Hungerford
Newbury
Basingstoke
Andover
Whitchurch
Stockbridge
Winchester
Alton
Farnham
Hartley Wintney
Aldershot
Basingstoke
Petersfield
Haslemere
Midhurst
Horsham
Arundel
Chichester
Salisbury
Warminster
Shrewton
Tisbury
Wilton
Devizes
Pewsey
Trowbridge
Calne
Chippenham
Wootton Bassett
Cricklade
Fairford
Burford
Chipping Norton
Banbury
Daventry
Northampton
Towcester
Newport Pagnell
Olney
Wellingborough
Kettering
Corby
Oundle
Peterborough
Whittlesey
March
Ely
Newmarket
Bury St Edmunds
Thetford
Diss
Harleston
Bungay
Beccles
Lowestoft
Yarmouth
Aylsham
Cromer
Holt
Fakenham
Swaffham
Downham Market
King's Lynn
Wisbech
Spalding
Boston
Sleaford
Grantham
Stamford
Oakham
Melton Mowbray
Loughborough
Leicester
Market Harborough
Rugby
Coventry
Warwick
Stratford on Avon
Evesham
Worcester
Droitwich
Kidderminster
Bewdley
Tenbury
Ludlow
Shrewsbury
Oswestry
Wrexham
Chester
Nantwich
Crewe
Stafford
Rugeley
Lichfield
Tamworth
Atherstone
Nuneaton
Hinckley
Market Bosworth
Ashby de la Zouch
Burton on Trent
Uttoxeter
Derby
Ashbourne
Matlock
Chesterfield
Sheffield
Doncaster
Retford
Gainsborough
Lincoln
Louth
Mablethorpe
Skegness
Boston
Spalding
Peterborough
Stamford
Grantham
Newark
Southwell
Mansfield
Worksop
Rotherham
Barnsley
Wakefield
Pontefract
Selby
York
Malton
Scarborough
Whitby
Middlesbrough
Stockton
Darlington
Richmond
Northallerton
Thirsk
Ripon
Harrogate
Knaresborough
Wetherby
Tadcaster
Leeds
Bradford
Halifax
Huddersfield
Dewsbury
Wakefield
Castleford
Pontefract
Goole
Howden
Beverley
Hull
Driffield
Bridlington
Filey
Scarborough
Whitby
Saltburn
Redcar
Middlesbrough
Stockton
Darlington
Richmond
Catterick

THE WEATHER OF APRIL.

THE characteristic features of the weather of April were a very high mean temperature, great excess of sunshine, and a marked deficiency of rainfall. Taking the kingdom as a whole the mean temperature was 3·7° above the normal, the excess varying from 4·7° in the north-east of England and about 4·0° in the east of Scotland and midland counties of England, to 3·1° in the south of Ireland. As compared with the normal the warmth was very evenly distributed over the country. Owing to the radiation weather that prevailed during the greater part of the month frost was very common especially in inland districts. During the first ten days of the month conditions were in general unsettled with frequent heavy falls of rain and gales from the west and south-west in many parts. Until the 4th the low pressure systems were central to the west of Ireland, but later the core of the cyclonic disturbance was located off the north of Scotland the area of high pressure being in the vicinity of the Azores. Thunderstorms or thunder only, accompanied in many cases by hail, occurred almost daily from the 1st to the 9th in some parts of the United Kingdom being most frequent in Scotland and the north of England. The heaviest rains were in general reported from the 4th to the 6th. Falls exceeding an inch and a half in the 24 hours were uncommon, none being noted on the 4th. On the 5th Bendamph measured 1·58 in. and Glencarron 1.51 in., and on the 6th Lock Stack reported 2.46 in., Ballachulish House 1·59 in., and Glencarron 1·51 in. The month opened with high temperature, 69° being recorded at Cromer and 68° at Norwich on the 1st, but over the whole of Scotland, Ireland, Wales, and the north-western counties of England, the temperature during the first half of the month seldom touched 60°. The lowest temperature noted during this period was 23° on the 9th at Balmoral.

From the 11th until the end of the month remarkably dry, sunny and warm weather prevailed over the greater portion of the British Islands, the drought being most pronounced to the south of a line joining the Tees and Carmarthen where in many localities an absolute drought of three weeks duration was in progress at the end of the month. On the 12th, when the north of the country was under the influence of a deep cyclonic centre near Iceland, the wind rose in some parts of Scotland to the force of a gale with heavy rain in some western localities, 1·99 in. being noted at Glencarron, 1·72 in. at Invergarry and 1·59 in. at Bendamph. At Lough Caragh (Lickeen) Co. Kerry, a "rain spell" of 84 days terminated on April 15th, it having rained every day since January 23rd. After the 14th the practically uninterrupted series of cyclonic disturbances which had prevailed for many weeks came to an end, the Azores anti-cyclone extending its borders towards Ireland, and until the end of the month the anti-cyclonic type of weather was rarely interrupted. High temperatures were observed in the north of Scotland on the

17th when the thermometer rose to 70° at Nairn and to 68° at Fort-Augustus. Remarkable extremes of temperature were noted on the 20th and 21st. On the former day shade maxima of 75° were noted at stations as far apart as Camden Square and Gordon Castle, and on the 21st the temperature rose to 76° at Camden Square and to 75° at Manchester. The minimum temperatures were equally notable, falling on the 19th to 25° at West Linton, on the 20th (night of 19th and 20th) to 28° at Eskdalemuir and 32° at Nottingham, while a frost on grass occurred over a considerable area on the 21st. The daily range of temperature was large, exceeding 30° in many places and reaching 36° at St. Andrews on the 20th. The maximum temperatures on the 20th and 21st at Camden Square were the highest in April since 1901 when a maximum of 76·8° was recorded.

During the last ten days of the month warm dry and sunny weather continued to prevail in most localities. On the 29th a small cyclonic disturbance, which came up the English Channel from the south, occasioned heavy rains in some places, thunder being noted at Tyn-y-waun and a thunderstorm at Coupar Angus, while at Bucknal in Lincolnshire a change of wind to the east was associated with a fall of temperature amounting to 20° in 15 minutes.

The general rainfall of the month expressed as a percentage of the average, was :—England and Wales, 62; Scotland, 106; Ireland, 72; British Isles, 76.

FIRST IMPRESSIONS OF AN INDIAN CLIMATE.

By F. L. Halliwell.

It has often occurred to me to wonder what must be ones first impressions of a tropical climate, and now, after some 40 years in England, I find myself living only some 20° N. of the equator. Having for many years been interested in matters meteorological, I venture to give a few of my more striking impressions, not confining myself strictly to meteorology.

In the first place I should remark that Karachi, where I am located, is a dry and sunny district, with an annual average rainfall of about 10 inches, and days with rain some 6 per annum.

As regards twilight, concerning which it is frequently asserted there is none in tropical countries, I was decidedly surprised, for though daylight wanes much more rapidly here than in England, there is visible twilight for more than an hour after sunset, and increased starlight and moonlight to some extent compensate, though probably the reason for one taking so little notice of the reduction is due to the fact that the average person does not time the duration of twilight, but merely lights a lamp when it becomes otherwise too dark to see, or, if out of reach of artificial light, times his movements

by the moment when it becomes too dark to see rather than with relation to the hour of sunset.

With reference to rainfall, of which 8 inches in 36 hours is the greatest fall I have so far experienced (this of course being exceptional for this district) my suprise was much greater at the effects rather than the actual rate of rainfall, since I have many times in England seen it rain for several hours at a greater apparent rate than here, and could scarcely believe the total would have been so great, though the washing away of roads and railways bore striking testimony to the exceptional nature of the fall. The most amazing effect however took about a week to materialise, being the transformation of this normally sandy and barren district into the semblance of green pastureland, which gave one greatly to wonder where the seeds came from, and whether a desert such as the Sahara would be as quickly covered under similar circumstances, supposing them possible.

Daily temperatures in this part of India during the months of June to September rarely fail to reach 90° and only occasionally fall below 80°, but equipped with suitable dress and a pith helmet one feels much less discomfort than is experienced in England with 80° and 70° respectively as max. and min.

A really hot day, however, of which these parts fortunately endure but few, yields some surprising effects, my record experience being on June 4th, when a shade temperature of 112° and over (max. 117°) was experienced for several hours, accompanied by a strong breeze. The latter had one curious effect similar to that of a biting N.E. wind in England, in that it caused a tingling of nose and ears; and chairs and tables were not only warm, but actually uncomfortably hot to sit upon or touch.

What the relative humidity was, I have no actual means of determining, but late in the day a standard thermometer registered 104° in the shade, and the same thermometer quickly wrapped with wet muslin and exposed in the same position descended to 79° within a few minutes. When exposed to the wind one was quite unconscious of perspiring, though a very brief period of shelter from the wind proved the matter quite beyond any argument.

On first arrival in a place so uniformly fine and sunny I found it amusingly difficult to open a conversation without reference to the state of the weather, which, except when it rains is quite unusual, and it is still rather a novelty to be able to arrange on outdoor expedition weeks ahead without having to take into consideration weather possibilities.

When it does rain, however, there is no lack of experiences to recount, for naturally buildings are erected more with a view to keeping out sun and heat than rain, and the stock of pots and pans, to say nothing of buckets and baths, is often inadequate to meet the exigencies of the case in the shape of leaky spots.

ARTICLES ON WEATHER IN AN OLD "GARDENER'S DICTIONARY."

By A. E. Swinton, B.A.

On turning over the leaves of a book bought at a recent auction sale, entitled a "Gardener's Dictionary," I was much interested in the articles dealing with weather under the headings of "Barometer," "Freezing," "Thunder," "Rain" and "Wind."

The catalogue of the sale gave the date as 1612, but though the title page was gone I soon discovered that this was too early by many years as Halley's name was frequently quoted, and on reading further I found a meteorological table containing observations taken every three hours on June 2nd, 1721. This shows that the book was published at least 110 years later than 1612. The gardeners at Marchmont House, Berwickshire, by whom the book was used, have inscribed their names in it and some of them give dates. The earliest date I have yet discovered being 1760.

I will begin by quoting from the article "Thunder." "Thunder is defin'd by some to be a Noise in the lowest Region of the Air, excited by a sudden kindling of sulphureous Exhalations.

Some also account for it, by supposing two clouds impending over one another; the upper and rarer whereof becoming condens'd by a fresh Accession of the Air, rais'd thither by Warmth from the lower Parts of the Atmosphere, or driven upon it by the Wind, immediately falls forcibly down upon the lower and denser Cloud; by which Fall the Air interposed between the two being compressed, that next the Extremites of the two Clouds is squeez'd out, and leaves Room for the Extremity of the upper Cloud to close tight upon the under; thus a great Quantity of Air is inclos'd which escaping through some winding irregular Vent or Passage, it occasions the Noise we call *Thunder*."

The book points out that this does not give any account of Lightning, and suggests explosion as the cause.

"Sir Isaac Newton says, There are sulphureous Exhalations always ascending into the Air, when the Earth is dry; these they ferment with the nitrous Acids, and sometimes taking Fire, generate into *Thunder*, *Lightnings*, &c."

He says that the air must contain "Exhalations carry'd off from *Sulphur*, *Bitumens*, *volatile Salts*, &c." which are "rais'd higher or lower according to their greater or less Degree of Subtility and Activity, and more copiously spread in this or that Quarter, according to the Direction of the Winds, &c." Explosions in Coal Mines are adduced as evidence, and it is suggested that the "*Summer* Heat, whenever extraordinary, raises up out of the Earth . . . a great Quantity of sulphureous Vapours, which are of such a Nature, as that meeting with the Nitre of the Air they work upon each other, and thereby begin a further Degree of Heat, which gradually increases till at last it arrives at a certain Pitch, and then they fall upon and

work upon one another, producing an actual Fire and Flame, which with wonderful Swiftness fires the whole train, and so produces a Flash and a Noise. Thus Dr. Hook."

The smell of ozone after a thunderstorm was thought to be a smell of burning sulphur and this suggested that thunderstorms were produced by the explosion of "sulphureous Vapours."

"Now that there is in *Lightning* a sulphureous Vapour, is manifest from the sulphureous Smell that attends it, and the sultry Heat in the Air which is commonly a Fore-runner of *Lightning*.

And that there is a nitrous Vapour in it we may reasonably judge, because we do not know of any Body so liable to a sudden and violent Explosion."

As evidence for spontaneous combustion the author says he is told, "that a Mixture of Sulphur and Filings of Steel with the Admission of a little Water . . . . will of itself break into actual fire." This he regards as the cause of the warmth of the Bath and other hot springs, and of volcanic eruptions.

Mr. Le Clerc is next cited, who says :—

"In all aerial Fires there are three Things observable :—

1. That they are lighted without any human Means, and by some invisible Way.
2. That they run about the Air in various Figures.
3. That some of them continues longer than others do ; but yet they all vanish in a short time.

In order to make a Flame or Spark appear, there is nothing more necessary, than that there should be some Particle so whirled about in the Air, as to cast aside all the grosser matter, and play about in the most subtil Part of the Air.

Now, there are some Matters which are apter to be put in motion than others ; such as the Parts of Sulphur, Bitumen, Nitre, &c. . . . it is no difficult matter for one or two of those Particles to be whirl'd about by the Heat of the Air ; and when they are once inflamed, to set Fire to all the rest about them ; as a consequence of which it is observable, that these aerial Fires are common in *Summer* but more rare in *Winter* ; and by how much the *Summer* is hotter the more common such Fires are: And this sufficiently shows, that the Matter of such Fires is raised and inflamed by the Heat of the Air and the Impetuosity of its motion."

Then follow accounts of two chemical experiments for producing an explosion, and a suggestion that the ingredients of the explosive mixtures may be in the air, in a fine state of division. Some definitions of various kinds of "aerial fire" are appended.

"If the Fire begins at one End, and burns gradually, it is called a *Lamp* ; but if a long Exhalation takes Fire at once, it is called a *Dart*. Sometimes these Exhalations are hurried one way or the other by the Stream of the Air, while they are in Flame, sometimes they continue in the same place, and then they are called *Beams* ; at other times the Clouds part, and the Sky seems to retire, which

may be caus'd by the Wind, and a Flame will flash out at this Opening; when this happens it is call'd a *Chasm*.

When burning Exhalations have less Sulphur in them (which yields a paler Flame) than Nitre, Bitumen, or Tartar, they appear as red as Blood. . . . .

Those which are commonly called *Shooting Stars* are but small Exhalations in our Air, and therefore are not properly *Stars*.

Ignis Fatui [*Jack-in-a-Lanthorn*, *Will-in-a-Whisp*, &c.] seem to consist of a more greasy Exhalation."

There is no attempt to explain the connection between rain and a thunderstorm beyond the following brief paragraph.

"Rain generally attends *Thunder* and *Lightning*, either at the same Time or soon after; and it frequently rains faster after a Clap of *Thunder*. So that Rain seems to be the effect of *Thunder*."

It will be noticed that there is no reference to *Electricity* as the cause of thunderstorms. This explanation was suggested to various experimenters early in the 18th century, by the similarity of Leyden jar sparks to lightning. The definite proof of drawing electricity from thunderclouds by a pointed rod on a tower, was proposed by Benjamin Franklin in 1749. In the actual performance of the experiment however he was forestalled by Dalibard, who in 1752 set up an iron rod 40 feet high at Mary la Ville in France, and succeeded in drawing sparks from a passing cloud.

This furnishes further evidence for the date of the Dictionary, which may be fairly assigned to the second quarter of the 18th century. Since writing the remarks at the beginning of this article it has been pointed out to me that the book contains a reference to the year 1726.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

LARGE IONS IN THE ATMOSPHERE.

A COMMUNICATION from Mr. Gendle in a recent number of your Magazine calls for some comment. Mr. Gendle in the first place makes two statements, neither of which, considered in the light of recent experiments, can be accepted as correct.

The first of these is to the effect that during moderate rain there are more large ions present in the atmosphere than during heavy rain. Experiment shows the very opposite to be the case. Moreover, the number of large ions has been measured on several occasions during transition from light to heavy rain, and *vice versa*; the ionisation increasing to several times its original value as the rain became heavier, and decreasing as it became lighter. I think I am right in saying that on all occasions when the large ions have been

measured during very heavy rain the number present has been far in excess of that found on any occasion during ordinary rain, which I take to be what Mr. Gendle means by moderate rain.

The second statement put forward in this communication is that more large ions accompany rain than accompany snow. There is not a great deal of evidence on the point with regard to snow, but such as there is cannot be held to justify an assertion in such general terms. During one snowstorm, in which observations were taken, there were more large ions detected than was the case in the heaviest rainstorms investigated, and, generally speaking, the electrical conditions during snow are much the same as during heavy rain.

One would like to know more of the discussions of which Mr. Gendle speaks. In any case the final judgment must be given after reference to experiment, and little weight can be given to any discussion whose results are so little borne out by actual observation.

As the rest of the article is made up of considerations based upon these two erroneous statements any further comment is unnecessary, but one or two remarks towards the end makes one wonder if Mr. Gendle's conception of the nature of an ion is not just about as accurate as the two results of "recent discussions" quoted by him.

C. D. STEWART.

Kew, 31st March, 1914.

THE CLIMATE OF TORQUAY.

I HAVE read Mr. Bonacina's letter in your March number, and beg permission to make a few remarks thereon. Mr. Bonacina always seems (to me) to nurse a personal grudge against the British climate. But let that pass. He is quite wrong, however, in thinking that all England is practically much the same in respect of winter conditions. Between Peterborough and Penzance, for instance, there is a difference in January of about 6° or 7° in the mean temperature; and it is important to notice that this is, in all likelihood, made up chiefly when there is great cold, and not when persistent and far spread mildness prevails, as during February, 1914. As to sea-winds, they are always more or less cold, even in summer, if they blow with force. I do not think that snow on Dartmoor seriously affects the climate of South Devon, except, perhaps, after such blizzards as that of January, 1881. Invalids usually know nothing of climate, and they foolishly suppose that on the coast of Cornwall the sun is always shining, and frost is practically unknown. No part of the British archipelago entirely escapes frost. Even in Scilly 25° or 26° has been registered.

Instead of fuchsias, myrtles and yuccas, which along the S.W. coast are fairly hardy, Mr. Bonacina should have studied the behaviour of *Eucalyptus globulus* (blue gum) and *Acacia dealbata* (one of the "mimosas"). Both these may be termed "vegetable thermometers." If they die of cold it is probable that the temperature has fallen to 20° (more or less). I believe I am right in saying

that at Rome, many years ago, all or most of the blue gums were destroyed by a frost of this severity. The extreme degree of cold is more important in this connection than the mean temperature. As to the mimosas, Mons. Daveau, of Montpellier, assures me that they and the palms have been "completely frozen" this winter, though some may shoot again from the base. He gives the temperature as —16° C. on "close-shaven soil." Great devastation was wrought. At Abbotsbury, Dorset, however, an acacia, about 70 feet high, was "a sheet of yellow" many weeks ago.

It may interest many to know that in the gardens of Logan House, about $7\frac{1}{2}$ miles N.N.W. from the Mull of Galloway, and in 54°44′ and 4°57′, there are *Cordylines* about 18 feet high, and even *Dicksonia antarctica* (tree-ferns). The latter are protected in winter by placing straw round the trunks, but more as a precaution than as an actual necessity. Botanico-meteorology has been much neglected.

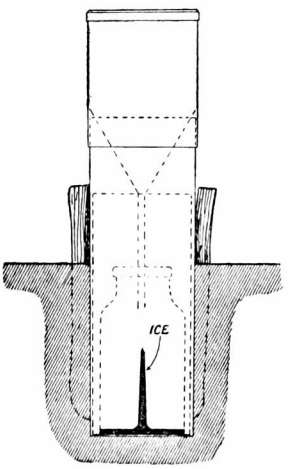
E. G. ALDRIDGE, F.R.Met.Soc.

Barnstaple, 20th March, 1914.

A RAIN GAUGE ICE PILLAR.

This phenomenon was noticed in a 5 in. Snowdon rain gauge situated 2,145 ft. above sea level in the Black Mountains, East Breconshire, on a bleak and windy spot.

On the night of December 29th last, a previous snowfall had drifted a little into the funnel, and the following day was cloudless, very warm in the sun, but very cold in the shade, with a light wind. The max. and min. temperature being 28° and 19°, and about 23° at time of inspection.



The gauge contained an inner cylinder and a bottle forming three air spaces between the ice pillar and the outer cover, while the snow in the funnel was in contact with the metal warmed by the strong sun rays. The gauge was also partly surrounded with wooden pegs to keep it firm, and between which the cold wind could come in contact with the cylinder below the surface.

It is evident that the snow-melting must have been very slow and the drippings very regular, as the pillar was almost the same diameter—like a lead pencil—from top to bottom, from 3 to 4 inches long, but on the bottom was a layer of ice about a quarter of an inch thick, being the effect perhaps of the failure of the cold to freeze all the drippings at the same time. On lifting the bottle out and turning it, the pillar broke at the bottom.

J. R. GETHIN JONES.

VISIBILITY.

MAY I remark that the observations of Mr. H. S. Tabor do not at all coincide with mine? He says that he has always found the greatest number of instances of visibility with north-easterly or easterly winds. I have always found the opposite to be the case; westerly or south-westerly winds being most conducive to visibility, the winds from opposite quarters always producing haziness on the horizon in *any* locality from which I have taken observations.

It is curious your correspondent mentioning stations to the south-west of London, because I took observations at a place in that neighbourhood for many years, and arrived at the same conclusion that he has, that it was the London smoke that made the skies so hazy with north-easterly wind. I was not satisfied, however, and carried out some observations in various places in the country, including Ilfracombe, N. Devon; Worthing, Sussex; and here. All these places being too far away from any large manufacturing town to be affected by its "smokiness," I concluded that my observations would be reliable, and I found the same thing at each place. With a west or south-west wind at Ilfracombe one could frequently see the Welsh coast, and, incidentally, it was nearly always a sign of unsettled weather, whilst a north-east wind would create so much haze that even Lundy Island would sometimes become invisible. At Worthing one could often see the houses on the front at Brighton with a westerly wind, but an easterly wind brought a peculiar haze which veiled the view more or less entirely. Here we have the "Reculvers," at Herne Bay, which are frequently visible in westerly winds and are generally signs of rain. If my memory serves me correctly, I think the Hon. Rollo Russell once investigated this matter and found that the general haziness of the north-easterly wind was due to mixed currents of air, the surface wind blending at a certain altitude with the permanent south-westerly variables.

D. W. HORNER, F.R.Met.Soc.

Westgate-on-Sea.

REVIEWS.

Instituto Central Meteorológico y Geofisico de Chile. Publicaciones bajo la direction del DR. WALTER KNOCHE. *No. 4, Observaciones Meteor. en la Isla de Pascua, Mayo, 1911—Abril, 1912.* (Meteorological Observations in Easter Island, May, 1911, to April, 1912.) Size $14\frac{1}{2} \times 10\frac{1}{2}$. Pp. viii. + 180, + plates.

THE meteorological station on Easter Island (lat. 27° 10′ S., long. 109° 26′ W.) is located on the south-west part of this South Pacific Patmos, at a height of 98 feet, and close to the coast. The station is one of the first order, and has a very complete installation of the best instruments. The registering apparatus required constant care and attention on the part of the observer, since the air was very humid and full of salt, causing much oxidization of the metallic

parts. Much trouble was also due to the insects who were particu, larly partial to the ink in the pens of the automatic instruments-the supply frequently having to be renewed two or three times a day. The time of the Island was determined by noting the moment when the upper edge of the sun sunk below the sea horizon, the observer being furnished with a table of the hours of sunset throughout the year prepared in the Santiago Observatory. Two subsidiary stations were established in the vicinity of the Observatory of *Mataveri*, at heights of 590 and 1,050 feet.

Tri-daily observations are given in extenso on the usual international form, and hourly values have been tabulated for the principal elements. Cloud amount, species and direction, were noted eight times a day, between the hours of 6 a.m. and 9 p.m. Complete summaries of all the data are given at the end of the general tables, and in a long chapter Dr. Knoche summarises the salient features of the climate. A curious characteristic is that on the mean of the year a relatively large amount of sunshine is associated with a considerable amount of cloud and days with precipitation. Compared with Rome, it is found that whereas Easter Island has 2,443 hours of sunshine in the year, forming 54 per cent. of the possible, the cloud amount there is 6·6 and the days with measurable rain 209, Rome, on the other hand, has 2,394 hours of sunshine (56 per cent. of the possible), with a mean cloud amount of 4·1 and 97 days with rain. In the whole year there were only 12 days without sunshine at Easter Island. The mean annual temperature is 68°·4, the warmest month being February, mean 74°·8, and the coolest October, mean 64°·2, the extremes being 88° and 51°. The total rainfall at the base station was 49·95 in , at 590 feet above the sea 1·30 in. less, but at the height of 1,050 feet the fall increased to 81 in. The maximum fall in one day was 2·95 in. on the 22nd March, which was the wettest month of the year, with 10·60 in. In addition to the chapters on Meteorology, there are others dealing with the botany, geology, geomorfology and seismology, each by well known Chilean experts. The volume as a whole is one of great interest, treating as it does with a remote and little known region.

Climate and Weather of Australia, by H. A. Hunt, Griffith Taylor and E. T. Quayle. Melbourne: Albert T. Mallett, 1913. Size $9\frac{1}{4} \times 6$, pp. 93, maps and charts. Price 5s.

The size of this volume is much less than its importance, because in the 93 pages which it contains is compressed an immense amount of information of the greatest value, not only to the meteorologist but to all interested in the prosperity and expansion of the rapidly increasing agricultural interests of the Australian Commonwealth. A pioneer work of this nature is one that presents immense difficulties in its compilation, and the Authors are in every way to be congratulated on the exceedingly well balanced manner in which the

subject has been treated. There are 41 full page maps comprising 159 figures, in which the climate and weather types of the Continent are graphically delineated. The widely scattered work of Russell, Ellery, and Sir Chas. Todd is incorporated with the recent labours of Mr. Hunt, the Commonwealth Meteorologist, and the whole brought to a focus in the volume before us. Three wireless stations have been established to aid in weather forecasting, but the most southern of these, viz. that on Adélie Land, the site of Dr. Mawson's highly successful Antarctic Expedition, has recently been discontinued.

This volume constitutes a valuable contribution to southern hemisphere meteorology, and is characterised by an easy and lucid style and method of treatment rarely to be found in works of this class.

Meteorological Office. Geophysical Memoirs, No. 5. The International Kite and Balloon Ascents. By ERNEST GOLD, M.A. London: H.M. Stationery Office. To be purchased from the Meteorological Office, Exhibition Road, South Kensington, London, S.W. 1913. Size 12 × 10, pp. 84 + 11 plates. Price 1s. 6d.

AT the twenty-fifth Annual Congress of the German Meteorological Society, held at Hamburg in 1908, a competition on Upper Air problems was announced, and in 1912 Mr. Gold was awarded the first prize for the memoir under consideration, which has now been printed by the Meteorological Office as one of the *Geophysical Memoirs*. In this dissertation the basis of the study is derived almost wholly from the European observations contained in the publications of the International Commission for Scientific Aeronautics during the six years, 1904--1909, but in addition all available sources of information have been utilised, and more than 12,000 individual observations examined. The records from balloons carrying meteorographs have been supplemented by kite observations so as to enable the low level conditions to be studied more completely than would have been otherwise possible. The memoir is divided into two parts which deal with Temperature and Wind. The Temperature data are discussed in great detail; the first section treats of mean temperatures and gradients of temperature, then comes a discussion of the annual and diurnal variation of temperature at different heights and places. An interesting chapter on the stratosphere follows, after which the temperatures under cyclonic and anti-cyclonic conditions are examined. The second part of the work deals with the winds of the upper air as deduced from the drift of registering balloons, by pilot balloons and kite observations. It is quite impossible in a short notice to attempt even to summarise the many valuable conclusions which Mr. Gold has drawn from the great mass of material utilised in this work. The intrinsic importance of the author's upper air researches is well known, and in the comprehensive memoir under notice one is able to appreciate to the full the labour and ingenuity brought to bear on fundamental problems of atmospheric circulation.

RAINFALL TABLE FOR APRIL, 1914.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea.	RAINFALL OF MONTH.	
					Aver. 1875—1909.	1914.
		° ′	° ′	ft.	in.	in.
Camden Square	*London*	51 32	0 8	111	1·74	·81
Tenterden	*Kent*	51 4	*0 41	190	1·77	1·26
Arundel (Patching)	*Sussex*	50 51	0 27	130	1·82	2·22
Fawley (Cadland)	*Hampshire*	50 50	1 22	52	1·98	1·42
Oxford (Magdalen College)	*Oxfordshire*	51 45	1 15	186	1·67	·94
Wellingborough (Croyland Abbey)	*Northampton*	52 18	0 41	174	1·78	·65
Shoeburyness	*Essex*	51 31	*0 48	13	1·25	·70
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	1·62	·74
Geldeston [Beccles]	*Norfolk*	52 27	*1 31	38	1·55	·63
Polapit Tamar [Launceston]	*Devon*	50 40	4 22	315	2·34	2·22
Rousdon [Lyme Regis]	,,	50 41	3 0	516	2·39	1·38
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	2·09	1·46
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	2·20	1·48
Coventry (Kingswood)	*Warwickshire*	52 24	1 30	340	1·96	1·43
Boston	*Lincolnshire*	52 58	0 1	11	1·57	·98
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	1·62	·70
Macclesfield	*Cheshire*	53 15	2 7	501	2·02	1·50
Southport (Hesketh Park)	*Lancashire*	53 39	2 59	38	1·84	·85
Arncliffe Vicarage	*Yorkshire, W.R.*	54 8	2 6	732	3·73	2·03
Wetherby (Ribston Hall)	,, ,,	53 59	1 24	130	1·85	·92
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	1·69	·37
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	1·84	·74
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	6·91	5·71
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	2·50	2·89
Haverfordwest	*Pembroke*	51 48	4 58	90	2·82	1·15
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	2·48	·66
Llandudno	*Carnarvon*	53 20	3 50	72	1·79	·47
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	2·50	2·11
Marchmont House	*Berwick*	55 44	2 24	498	2·28	·85
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	2·81	3·23
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	1·86	2·39
Inveraray (Newtown)	*Argyll*	56 14	5 4	17	3·69	6·67
Mull (Quinish)	,,	56 34	6 13	35	2·98	4·26
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	1·93	·79
Braemar	*Aberdeen*	57 0	3 24	1114	2·30	1·45
Aberdeen (Cranford)	,,	57 8	2 7	120	2·23	·65
Cawdor	*Nairn*	57 31	3 57	250	1·62	·30
Fort Augustus (S. Benedict's)	*E. Inverness*	57 9	4 41	68	2·22	3·47
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	4·70	8·70
Dunrobin Castle	*Sutherland*	57 59	3 56	14	2·02	1·05
Wick	*Caithness*	58 26	3 6	77	1·89	1·12
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	3·46	2·51
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	2·68	1·44
Nenagh (Castle Lough)	*Tipperary*	52 54	8 24	120	2·54	2·21
Ennistymon House	*Clare*	52 57	9 18	37	2·81	2·03
Gorey (Courtown House)	*Wexford*	52 40	6 13	80	2·37	1·09
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	2·54	1·80
Dublin (Fitz William Square)	*Dublin*	53 21	6 14	54	2·03	·72
Mullingar (Belvedere)	*Westmeath*	53 29	7 22	367	2·37	1·58
Crossmolina (Enniscoe)	*Mayo*	54 4	9 16	74	3·13	2·88
Cong (The Glebe)	,,	53 33	9 16	112	2·98	2·19
Collooney (Markree Obsy.)	*Sligo*	54 11	8 27	127	2·52	2·21
Seaforde	*Down*	54 19	5 50	180	2·76	1·77
Bushmills (Dundarave)	*Antrim*	55 12	6 30	162	2·08	1·71
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	2·50	

RAINFALL TABLE FOR APRIL, 1914—*continued.*

RAINFALL OF MONTH (*con.*)					RAINFALL FROM JAN. 1.					
Diff. from Av. in.	% of Av.	Max. in 24 hours. in.	Max. in 24 hours. Date.	No. of Days	Aver. 1875–1909. in.	1914. in.	Diff. from Aver. in.	% of Av.	Mean Annual 1875–1909. in.	STATION.
— ·93	47	·19	4, 5	9	6·93	8·24	+1·31	119	25·11	Camden Square
— ·51	71	·41	5	11	7·76	10·84	+3·08	140	27·64	Tenterden
+ ·40	122	·49	30	9	8·53	12·13	+3·60	142	30·48	Patching
— ·56	72	·30	5	11	9·18	11·67	+2·49	127	31·87	Cadland
— ·73	56	·24	4	12	6·52	6·72	+ ·20	103	24·58	Oxford
—1·13	37	·14	4, 5	9	7·05	5·32	—1·73	75	25·17	Croyland Abbey
— ·55	56	·17	5	14	4·96	6·65	+1·69	134	19·28	Shoeburyness
— ·88	46	·21	4	9	6·62	8·80	+2·18	133	25·40	Westley
— ·92	41	·14	5	9	6·06	7·29	+1·23	120	23·73	Geldeston
— ·12	95	·58	10	12	11·62	16·89	+5·27	145	38·27	Polapit Tamar
—1·01	58	·39	9	11	10·13	11·23	+1·10	111	33·54	Rousdon
— ·63	70	·26	5	11	8·55	8·95	+ ·40	105	29·81	Stroud
— ·72	67	·28	5	10	9·07	8·98	— ·09	99	32·41	Wolstaston
— ·53	73	·36	9	10	8·08	6·28	—1·80	78	28·98	Coventry
— ·59	62	·30	4	12	6·11	5·98	— ·13	98	23·35	Boston
— ·92	43	·15	6	9	6·66	4·43	—2·23	66	24·46	Hodsock Priory
— ·52	74	·27	10	12	9·48	10·84	+1·36	114	34·73	Macclesfield
— ·99	46	·41	4	10	8·57	7·70	— ·87	90	32·70	Southport
—1·70	54	·55	4	8	20·04	22·35	+2·31	112	61·49	Arncliffe
— ·93	50	·28	10	6	7·37	6·09	—1·28	83	26·87	Ribston Hall
—1·32	22	·13	4	8	7·01	5·12	—1·89	73	26·42	Hull
—1·10	40	·21	6	10	7·47	6·15	—1·32	82	27·94	Newcastle
—1·20	83	1·13	4	15	41·94	53·09	+11·15	127	129·48	Seathwaite
+ ·39	116	·59	5	12	12·11	15·87	+3·76	131	42·28	Cardiff
—1·67	41	·37	4	10	14·09	14·16	+ ·07	100	46·81	Haverfordwest
—1·82	27	·16	22	13	12·52	15·54	+3·02	124	45·46	Gogerddan
—1·32	26	·12	4	9	8·54	8·30	— ·24	97	30·36	Llandudno
— ·39	85	·41	5	16	13·35	19·05	+5·70	143	43·47	Cargen
—1·43	37	·20	5	11	9·47	8·28	—1·19	87	33·76	Marchmont
+ ·42	115	·79	12	16	15·08	20·66	+5·58	137	49·77	Girvan
+ ·53	129	·57	5	14	10·70	13·42	+2·72	125	35·97	Glasgow
+2·98	181	1·69	12	16	22·15	30·06	+7·91	136	68·67	Inveraray
+1·28	143	1·04	12	15	17·26	20·70	+3·44	120	56·57	Quinish
—1·14	41	·26	9	7	7·91	7·97	+ ·06	101	28·64	Dundee
— ·85	63	·40	10	13	10·64	12·91	+2·27	121	34·93	Braemar
—1·58	29	·11	5, 29	12	9·60	7·86	—1·74	82	32·73	Aberdeen
—1·32	19	·18	23	3	8·31	6·55	—1·76	79	29·33	Cawdor
+1·25	157	·73	12	14	15·79	13·76	—2·03	87	44·53	Fort Augustus
+4·00	185	1·59	12	14	28·94	37·00	+8·06	128	83·93	Bendamph
— ·97	52	·40	23	10	9·99	10·70	+ ·71	107	31·90	Dunrobin Castle
— ·77	59	·25	22	16	8·84	8·64	— ·20	98	29·88	Wick
— ·95	73	.41	8	14	18·90	27·37	+8·47	145	54·81	Killarney
—1·24	54	·41	3	10	12·28	12·82	+ ·54	104	39·57	Waterford
— ·33	87	·53	4	13	12·30	16·39	+4·09	133	39·43	Castle Lough
— ·78	72	·41	4	14	13·79	19·74	+5·95	143	46·52	Ennistymon
—1·28	46	·49	3	8	10·59	11·16	+ ·57	105	34·99	Courtown Ho.
— ·74	71	·42	3	14	10·83	12·48	+1·65	115	35·92	Abbey Leix
—1·31	35	·20	3	11	8·08	6·30	—1·78	78	27·68	Dublin
— ·79	67	·38	12	12	10·78	11·88	+1·10	110	36·15	Mullingar.
— ·25	92	·37	4	15	17·04	21·94	+4·90	129	52·87	Enniscoe
— ·79	73	·41	4	14	15·29	21·07	+5·78	138	48·90	Cong
— ·31	88	·45	3	14	12·92	16·68	+3·76	129	42·71	Markree
— ·99	64	·56	4	12	11·82	11·98	+ ·16	101	38·91	Seaforde
— ·37	82	·25	7	16	10·56	12·80	+2·24	121	37·56	Dundarave
— ·16	94	·40	5, 6	16	11·62	15·73	+4·11	135	39·38	Omagh

SUPPLEMENTARY RAINFALL, APRIL, 1914.

Div.	STATION.	Rain inches.	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road .	1·28	XI.	Lligwy	·68
,,	Ramsgate.....	1·18	,,	Douglas	·94
,,	Hailsham	1·41	XII.	Stoneykirk, Ardwell House...	1·92
,,	Totland Bay, Aston House...	1·00	,,	Dalry, The Old Garroch.....	3·81
,,	Stockbridge, Ashley..	1·31	,,	Beattock, Kinnelhead	4·34
,,	Grayshott	1·74	,,	Langholm, Drove Road	2·46
III.	Harrow Weald, Hill House...	·76	XIII.	Meggat Water, Cramilt Lodge	2·81
,,	Caversham, Rectory Road ...	·85	,,	North Berwick Reservoir.....	...
,,	Pitsford, Sedgebrook.....	·65	,,	Edinburgh, Royal Observaty.	1·29
,,	Woburn, Milton Bryant.....	·92	XIV.	Maybole, Knockdon Farm ...	3·74
,,	Chatteris, The Priory..... ...	·47	XV.	Ballachulish House	7·24
IV.	Elsenham, Gaunts End	·83	,,	Campbeltown, Witchburn ..	3·32
,,	Colchester, Hill Ho., Lexden	·89	,,	Holy Loch, Ardnadam.....	5·34
,,	Ipswich, Rookwood,Copdock	·85	,,	Islay, Eallabus	2·85
,,	Blakeney..... . ..	·49	,,	Tiree, Cornaigmore	3·00
,,	Swaffham	·67	XVI.	Dollar Academy	1·90
V.	Bishops Cannings	1·56	,,	Balquhidder, Stronvar.....	6·15
,,	Wimborne, St. John's Hill ...	1·21	,,	Glenlyon, Meggernie Castle..	6·42
,,	Ashburton, Druid House.. ...	2·55	,,	Blair Atholl	2·23
,,	Cullompton	1·77	,,	Coupar Angus	·86
,,	Lynmouth, Rock House	2·70	,,	Montrose, Sunnyside Asylum.	·50
,,	Okehampton, Oaklands... ...	2·37	XVII.	Alford, Lynturk Manse	·59
,,	Hartland Abbey.....	1·76	,,	Fyvie Castle	·27
,,	Probus, Lamellyn.....	2·32	,,	Keith Station	·68
,,	North Cadbury Rectory.....	1·17	XVIII.	Rothiemurchus	1·23
VI.	Clifton, Pembroke Road.....	1·76	,,	Loch Quoich, Loan	19·65
,,	Ross, The Graig	1·53	,,	Drumnadrochit..... ..	1·80
,,	Shifnal, Hatton Grange.....	·92	,,	Skye, Dunvegan	6·86
,,	Droitwich.....	1·14	,,	Lochmaddy Bayhead	4·00
,,	Blockley, Upton Wold.....	1·27	,,	Glencarron Lodge	8·83
VII.	Market Overton.....	1·47	XIX.	Invershin	1·68
,,	Market Rasen	·85	,,	Melvich	1·57
,,	Bawtry, Hesley Hall	·67	,,	Loch Stack, Ardchullin	6·88
,,	Derby, Midland Railway.....	·78	XX.	Skibbereen Rectory	2·39
,,	Buxton	1·53	,,	Dunmanway, The Rectory ..	3·05
VIII.	Nantwich, Dorfold Hall	1·01	,,	Glanmire, Lota Lodge, No. 1	1·49
,,	Chatburn, Middlewood	1·15	,,	Mitchelstown Castle.....	1·25
,,	Cartmel, Flookburgh	·79	,,	Darrynane Abbey.....	2·26
IX.	Langsett Moor, Up. Midhope	1·40	,,	Clonmel, Bruce Villa	1·48
,,	Scarborough, Scalby	·89	,,	Newmarket-on-Fergus,Fenloe	1·85
,,	Ingleby Greenhow	·88	XXI.	Laragh, Glendalough	4·72
,,	Mickleton	1·80	,,	Ballycumber, Moorock Lodge	2·38
X.	Bellingham, High Green Manor	1·14	,,	Balbriggan, Ardgillan	1·33
,,	Ilderton, Lilburn Cottage ...	·66	XXII.	Woodlawn	2·04
,,	Keswick, The Bank.....	2·44	,,	Westport, St. Helens	3·35
XI.	Llanfrechfa Grange	2·57	,,	Dugort, Slievemore Hotel ...	3·97
,,	Treherbert, Tyn-y-waun	3·64	,,	Mohill Rectory	2·38
,,	Carmarthen, The Friary	1·53	XXIII.	Enniskillen, Portora.....	2·23
,,	Castle Malgwyn [Llechryd]...	1·11	,,	Dartrey [Cootehill]	1·78
,,	Crickhowell, Tal-y-maes.....	1·90	,,	Warrenpoint, Manor House ..	1·89
,,	New Radnor, Ednol	3·00	,,	Banbridge, Milltown	...
,,	Birmingham WW., Tyrmynydd	3·07	,,	Belfast, Cave Hill Road	1·61
,,	Lake Vyrnwy	...	,,	Glenarm Castle..... ...	2·63
,,	Llangyhanfal, Plâs Draw.....	·79	,,	Londonderry, Creggan Res...	2·06
,,	Dolgelly, Bryntirion.....	1·42	,,	Dunfanaghy, Horn Head ...	2·90
,,	Bettws-y-Coed, Tyn-y-bryn...	1·97	,,	Killybegs	2·82

METEOROLOGICAL NOTES ON APRIL, 1914.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Temp. for Temperature; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow; F for number of days Frost in Screen; f on Grass.

LONDON, CAMDEN SQUARE.—Fair or fine with occasional showers in the first 10 days, after which the month was brilliantly sunny, dry, and warm. Mean temp. 51°·8 or 3°·7 above the average. Duration of sunshine 211·8* hours, and of R 19·6 hours. Evaporation 1·84 in. Shade max. 76°·2 on 21st, the highest temp. recorded in April since 23rd April, 1901, when 76°·8 was registered; min. 34°·4 on 26th. F 0, f 7.

TENTERDEN.—Wet until 11th, then very dry and wind mostly E. Duration of sunshine 248† hours. Shade max. 72°·5 on 21st; min. 35°·0 on 26th. F 0, f 9.

TOTLAND BAY.—Duration of sunshine 234·6* hours, or 52·8 hours above the average. An absolute drought of 18 days from 11th to 28th. Shade max. 70°·1 on 29th; min. 34°·4 on 26th. F 0, f 2.

PITSFORD.—R 1·21 in. below the average. Mean temp. 49°·0. Shade max. 74°5 on 21st; min. 28°6 on 16th. F 5.

IPSWICH, COPDOCK.—After a rather dull opening, sunny weather set in on 12th and continued with a short break, from 22nd to 24th, until 30th, which proved completely sunless. Mean temp. 48°·8. Duration of sunshine 231·6* hours, and of R 14·7 hours. Shade max. 71°·0 on 21st; min. 31°·0 on 26th. F 2, f 16.

POLAPIT TAMAR.—Generally high day and low night temp. Practically the whole R fell in the first 10 days Shade max. 73°·0 on 29th, the highest recorded for April in the last 20 years; min. 30°·9 on 15th. F 1, f 6.

NORTH CADBURY.—Wet and stormy, but not without fine weather to 10th, after which no measurable R fell. Practically cloudless from 14th to 29th, except on 23rd—25th. The warmest and least cloudy April in 18 years. Shade max. 78°·0 on 29th; min. 32°·5 on 8th. F 0, f 14.

HODSOCK PRIORY.—Duration of sunshine 215·5* hours, which is the best in April since 1893. It is also necessary to go back to the same month for one with warmer days. Shade max. 73°·7 on 22nd; min. 28°·1 on 17th. F 6, f 17.

SOUTHPORT.—Duration of sunshine 212·9* hours, and of R 14·6 hours. Mean temp. 49°·0 or 3°·5 above the average, Evaporation 2·03 in. Shade max. 69°·0 on 19th; min. 32°·0 on 16th. F 1, f 12.

HULL.—Only 3 dull days and nearly all cloudless, bright nights. Duration of sunshine 177* hours. Shade max. 75°·0 on 22nd; min. 30°·0 on 17th. F 1, f 12.

HAVERFORDWEST.—Duration of sunshine 261·6* hours. Shade max. 69°·1 on 20th and 21st; min. 32°·8 on 12th.

BETTWS-Y-COED.—Mild and wet in the first 10 days, but dry, bright and sunny after. Cold E. winds.

MARCHMONT.—Duration of sunshine 235·3 hours on 29 days. Shade max. 74° on 28th; min. 30° on 9th and 15th. F 3, f 12.

HOLY LOCH, ARDNADAM.—The first half was wet, dull and cold, the last half dry and warm with slight haze. Shade max. 69°·7 on 21st; min. 33°·1 on 16th. F 0, f 13.

DRUMNADROCHIT.—R ·24 in. and rain days 3 below the average of 28 years. An excellent seed time from 15th.

LOCH STACK.—Duration of sunshine 130·8* hours.

WATERFORD.—Mean temp. 50°·0. No R after 13th. Shade max. 69°5 on 21st.

NEWMARKET-ON-FERGUS.—R registered every day from 24th January to 13th April, 80 days.

DUBLIN.—Changeable, showery and windy till 13th, then fine, bright and dry with a large diurnal range of temp. on several occasions Mean temp. 50°·0 or 2°·7 above the average. Shade max. 68°·0 on 21st; min. 36°·9 on 16th. F 0, f 0.

KILLYBEGS.—A fine month and the latter half warm and sunny.

* Campbell-Stokes. † Jordan.

Climatological Table for the British Empire, November, 1913.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	Total Rain. Depth.	Total Rain. Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	59·9	11	29·8	23	54·3	41·3	44·5	89	90·7	27·7	2·35	17	7·7
Malta	75·2	1*	55·0	28, 30	69·8	62·1	54·0	71	141·0	..	1·39	6	9·6
Lagos	99·3	24	72·2	3, 5	90·1	75·1	74·1	73	152·2	70·0	·61	3	5·1
Cape Town	91·3	19	45·4	12	74·2	57·3	54·2	66	...	...	1·75	10	4·9
Natal, Durban ...	78·0	20	59·0	28	72·8	65·3	65·7	80	...	...	4·15	15	7·0
Johannesburg	83·8	18	47·0	14	75·8	54·2	48·1	62	152·1	46·5	4·07	10	4·1
Mauritius	87·4	27	64·1	12	83·8	66·3	63·4	69	155·5	48·9	·83	6	4·6
Bloemfontein	90·2	18	43·9	26	82·0	55·1	46·8	47	...	...	·91	6	3·3
Calcutta...	85·6	7	58·1	26	80·8	63·4	61·8	72	...	51·7	·54	2	2·8
Bombay...	90·2	1	70·1	14	86·9	73·1	68·7	70	138·9	60·9	...	...	1·2
Madras	87·6	21	67·3	15	84·0	73·4	71·2	81	137·4	63·4	17·99	12	6·2
Colombo, Ceylon ...	90·5	26	70·1	17	85·9	73·1	73·0	82	159·9	63·8	11·50	16	6·7
Hongkong	82·1	7	52·0	15	74·0	66·0	61·0	72	...	...	·74	4	5·6
Sydney	89·4	21	48·1	5	75·4	59·1	47·2	44	144·3	40·2	·80	6	3·9
Melbourne	89·1	29	41·0	4	68·6	49·3	45·7	59	148·5	36·5	1·70	17	6·3
Adelaide	97·9	30	42·9	6	75·6	54·7	49·9	53	157·5	39·0	1·36	11	4·8
Perth	104·6	24	44·9	8	74·8	55·4	52·9	64	164·5	40·0	·85	9	4·5
Coolgardie	106·2	25	48·8	9	88·3	58·0	46·4	34	169·2	45·2	·14	3	2·6
Hobart, Tasmania ...	75·9	29	35·2	5	61·2	45·9	41·5	60	143·2	30·2	3·67	18	6·9
Wellington	71·8	11	41·6	13	63·6	51·2	49·5	75	142·0	34·6	4·15	18	7·6
Auckland	72·0	24	47·0	13	66·1	54·0	52·7	77	145·0	44·0	6·16	22	6·1
Jamaica, Kingston ...	90·2	4	68·2	30	88·1	71·2	70·4	82	...	...	1·68	6	6·0
Grenada	87·0	3	70·0	25	83·9	74·2	...	76	137·0	...	10·39	20	4·5
Toronto	63·6	23	27·0	11	48·8	35·7	34·9	80	105·3	25·3	3·84	13	...
Fredericton	62·0	10	4·0	28	44·4	27·2	...	82	...	...	1·45	6	5·0
St. John, N.B. ...	61·8	9	12·0	28	45·8	33·3	32·0	75	...	...	1·37	6	6·0
Edmonton, Alberta ...	55·9	3	6·4	22	38·4	20·0	...	75	100·0	0·0	·05	3	5·9
Victoria, B.C.	55·8	3	31·3	21	48·8	39·3	41·0	88	...	...	4·70	17	7·0

* 12 and 14.

Johannesburg.—Bright sunshine 271·8 hours.

Mauritius.—Mean temp. of air 0°·5 below, dew point 0°·8 below, and R ·91 in. below, averages. Mean hourly velocity of wind 10·3 miles, or 0·4 below average.

Bloemfontein.—Extremely dry with wind and dust nearly every day.

COLOMBO.—Mean temp. of air 79°·5, or 0°·1 below, of dew point 0°·2 below, and R 1·66 in. above, averages. Mean velocity of wind 4·0 miles per hour. TSS on seven days.

HONGKONG.—Mean temp. of air 70°·0. Mean hourly velocity of wind 12·5 miles. Bright sunshine 171·3 hours.

Melbourne.—Mean temp. of air 2°·3 below, and R ·50 in. below, averages.

Adelaide.—Mean temp. of air 1°·9 above, and R ·21 in. above, averages.

Perth.—Max. temp. for November a record. Temp. of air normal, and R above average.

Coolgardie.—Temp. of air 2°·3 above, and R ·4 in. below, averages.

Hobart.—Temp. of air 4° below, and R 1·17 in. above, averages.

Wellington.—Mean temp. of air 0°·6 above, and R ·77 in. above, averages. Bright sunshine 188·9 hours.

Auckland.—A stormy month, R nearly twice the average.